R E P O R T R E S U M E S

ED 014 989 JC 670 913

INPUT-OUTPUT RELATIONSHIPS IN A SAMPLE OF CALIFORNIA PUBLIC JUNIOR COLLEGES.

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REPORT NUMBER TR-1 PUB DATE FEB 67
EDRS PRICE MF-$0.25 HC-$1.36 32P.

DESCRIPTORS- *JUNIOR COLLEGES, *COMMUNITY CHARACTERISTICS, EXPENDITURES, EDUCATIONAL FINANCE, PRODUCTIVITY, ANALYSIS OF VARIANCE, COLLEGE ROLE,

IN A STUDY OF RELATIONSHIPS BETWEEN FINANCIAL INPUT AND SELECTED OUTPUT MEASURES, WITH STATISTICAL CONTROL FOR VARIATIONS IN COMMUNITY CHARACTERISTICS, 15 PUBLIC CALIFORNIA JUNIOR COLLEGES WERE STUDIED WITH RESPECT TO THREE FINANCIAL VARIABLES (INSTRUCTIONAL EXPENDITURES PER AVERAGE DAILY ATTENDANCE (ADA) UNIT, TOTAL CURRENT EXPENSE PER ADA, AND NONINSTRUCTIONAL EXPENSES PER ADA) AND SEVEN OUTPUT MEASURES--(1) PERCENT OF VOCATIONAL STUDENTS COMPLETING PROGRAM OR SECURING RELEVANT EMPLOYMENT, (2) PERCENT OF ENROLLMENT RECEIVING AN AA DEGREE, (3) PERCENT OF ENROLLMENT TRANSFERRING TO SENIOR INSTITUTIONS, (4) PERCENT OF ENROLLMENT PLACED ON PROBATION, (5) PERCENT OF ENROLLMENT DISMISSED, (6) PERCENT OF ENROLLMENT COMPLETING BACHELOR'S DEGREE, AND (7) PERCENT OF PROBATION PLUS DISMISSAL. IT WAS FOUND THAT APPROXIMATELY HALF OF THE VARIATION IN THE OUTPUT MEASURES AND NEARLY ALL OF THE VARIATION IN FINANCIAL INPUT COULD BE EXPLAINED BY DIFFERENCES IN COMMUNITY CHARACTERISTICS. COMMUNITY DIFFERENCES SEEMED MOST EFFECTIVE IN THE DETERMINATION OF THE PERCENT OF TRANSFER STUDENTS (85 PERCENT OF THE VARIANCE) AND LESS EFFECTIVE (ABOUT ONE-THIRD OF THE VARIANCE) IN DETERMINING PERCENT OF STUDENTS EARNING AA DEGREE, EARNING BA DEGREES, AND BEING PLACED ON PROBATION. (WO)

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Technical Report No. 1

ED014989

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Center FOR THE *Study of Evaluation* OF INSTRUCTIONAL PROGRAMS

UNIVERSITY OF CALIF.
LOS ANGELES

NOV 3 1967

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University of California, Los Angeles, February 1967

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The CENTER FOR THE STUDY OF EVALUATION OF INSTRUCTIONAL PROGRAMS is engaged in research that will yield new ideas and new tools capable of analyzing and evaluating instruction. Staff members are creating new ways to evaluate content of curricula, methods of teaching and the multiple effects of both on students. The CENTER is unique because of its access to Southern California's elementary, secondary and higher schools of diverse socio-economic levels and cultural backgrounds. Three major aspects of the program are

Instructional Variables - Research in this area will be concerned with identifying and evaluating the effects of instructional variables, and with the development of conceptual models, learning theory and theory of instruction. The research involves the experimental study of the effects of differences in instruction as they may interact with individual differences among students.

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Criterion Measures - Research in this field is concerned with creating a new conceptualization of evaluation of instruction and in developing new instruments to evaluate knowledge acquired in school by measuring observable changes in cognitive, affective and physiological behavior. It will also involve evaluating the cost-effectiveness of instructional programs.

INPUT-OUTPUT RELATIONSHIPS IN A SAMPLE OF CALIFORNIA PUBLIC JUNIOR COLLEGES

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CSEIP Technical Report No. 1, February 1967
University of California, Los Angeles

The research and development reported herein was performed pursuant to a contract with the United States Department of Health, Education, and Welfare, Office of Education under the provisions of the Cooperative Research Program.

Input-Output Relationships
In a Sample of California Public Junior Colleges

Marvin C. Alkin and Vernon L. Hendrix

This study seeks to examine the nature of relationships among (1) certain measures of financial support, (2) community characteristics, and (3) selected output measures in California public junior colleges. Specifically, the relationships between the financial inputs and the output measures are sought, while controlling for community characteristics.

Sample

The colleges used in this study are taken from a sample of eighteen California public junior colleges which have been included in a nationwide research project financed by the University of Minnesota and the United States Office of Education (Cooperative Research Project #2849). The population for this nationwide research project consists of all of the public junior colleges listed in the 1964 Junior College Directory[1] that were in operation in the fall semester of 1962. These 396 colleges were classified according to six geographic regions, (California was one of these regions); size (above and below the median

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[1]Gleazer, Edmund J. Jr., Junior College Directory, Washington, D.C., American Association of Junior Colleges, 1964.

on total enrollment); curriculum (entirely transfer, entirely terminal, combined transfer-terminal); whether evening classes were offered or not offered; whether dormitory facilities were available or not available; and by ratio of full to part-time students. Based on this classification, a representative sample of 100 colleges was developed. Eighteen of the California junior colleges were included in the sample. Because adequate and comparable financial data could not be gathered for three of these colleges, the sample for this current study consists of 15.

Districts were defined, for data collection purposes, by taking the closest geographic approximation to the actual district, using the three primary types of areas for which census data is reported (counties, cities, and census tracts). Table I lists the 15 colleges and the "districts" for data purposes in 1950 and 1960. The simplest case is exemplified by Ventura College, where the district is county-wide and the data was gathered for Ventura County. More complicated situations are represented by Los Angeles City College and Los Angeles Valley College, which are represented by census tracts. Since both of these colleges are actually in the same district, a service area was defined by examining the number of high school graduates going to the various Los Angeles junior colleges. A high school attendance area was "assigned" to a junior college if the majority of graduates attending junior colleges went to that junior college. These attendance districts were then approximated with census tracts.

Variables

Three categories of variables are considered in this study. These variables (1) describe the nature of the district or community which each college serves, (2) indicate types and amounts of financial input, and (3) give some criterion indications of the productivity of each college.

Community Variables

In connection with Cooperative Research Project #2849, 72 items of data descriptive of the "communities" of the college districts were collected. This information consisted primarily of U.S. Census data and media research data. Fifty-two of these items pertained to the district or service area itself, whereas the remaining 20 encompassed larger areas. An examination of the 52 items for the sample of 100 colleges indicated that 14 basic dimensions or characteristics of junior colleges existed and they could be approximated by 21 of the original set of 52 variables.[2]

In order to make the community data as comparable as possible with the criterion data which were for the 1964-1965 academic year, it was projected on a straight-line basis to the year 1964. The finance data also pertains to the 1964-1965 year. Because of extremely rapid changes on certain items

[2]The 14 basic dimensions and 21 selected variables were developed by the application of factor analytic techniques. Space prohibits the detailed description of this process in this report. The final report of Cooperative Research Project #2849 will be available from the United States Office of Education or the E.R.I.C. Junior College Clearing House at UCLA in June, 1967, and will contain detailed procedures and comparative community data for other than California colleges.

between the two census periods, a straight-line projection yielded negative values in a few situations. Where these situations occurred, the straight-line method was abandoned and the percent change from 1950 to 1960 was assumed to continue from 1960 to 1970 and the 1964 point on this line was then selected.

The 21 variables describing the districts are indicated in Table II. Where convenient, the code symbols, (e.g., C1), will be used in later discussion of these and other variables.

Finance Variables

There were three measures of financial input considered in this study. (See Table III.) The first of these--total instructional costs per student in Average Daily Attendance--gives an indication of the instructional expenditures (F1). The second variable (F2), which is the total current expense for education per ADA, provides an estimate of gross financial input. The last financial variable (F3) gives an estimate of non-instructional expenditures primarily related to educational programs, e.g., administrative services, special services, counseling, guidance, equipment, supplies, etc. This variable was derived by deleting instructional costs (F1) and transportation costs from total current expense for education (F2) prior to dividing by ADA.

Data on finance variables were collected in connection with a study performed for the Junior College Advisory Panel of the California State Board of Education.[3]

Output Variables

Seven measures were obtained from the colleges which were used to indicate the "output" from the college. These measures were calculated from data supplied by the colleges and are listed in Table IV. These give one measure of the colleges' productivity in the technical-vocational area (P1), three measures of its performance in primarily traditional academic areas (P2, P3, and P6) and three measures which give some indication of the non-voluntary "drop-out" rates (P4, P5, and P7) of the colleges.

These criterion measures are not completely appropriate but are, instead, gross, unbiased descriptions of what dispensations are made of student "inputs" by the colleges. Moreover, these criteria do not provide answers to questions involving the relative desirability of institutional objectives, e.g., how many students should transfer, or complete programs, etc., but are merely descriptive. However, they must suffice until more precise and appropriate measures of educational outcomes

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[3]Alkin, Marvin C., Financing Junior Colleges in California: A Critical Analysis of the State Support Program, Sacramento, California, California State Department of Education, 1966.

can be developed. Furthermore, since the measures were not obtained through actual follow-up procedures but are cross-sectional in nature (referring to the 1964-1965 academic year), a certain amount of error is present. It is assumed that this error is consistent for all the colleges. Similar error is assumed to be present in the community variables, thereby making no significant contribution to later measurements of relationships between these sets of variables.

Procedure

An appropriate model to describe the relationships among the indicated variables is multiple linear regression. A stepwise multiple regression computer program was used for the analyses. This program selects, from among the set of independent variables, the one which best predicts the dependent variable. It computes a regression equation and then selects from among the independent variables not in the equation the one which will contribute the most toward the increased prediction of the dependent variable. This procedure continues until an added variable fails to improve the prediction by a specified amount or, as in the case of this study, the number of variables in the equation is equal to the number of cases less one.

For the purposes of this study, it was necessary to compute three different sets of regression analyses. In the first set of analyses the output measures were each predicted by the 21 community variables. This was done to estimate the

extent to which the variation on these measures from college to college could be accounted for by differences in community characteristics. The results of these analyses are indicated in Table V.

Inasmuch as a perfect prediction can be obtained in this set of analyses by merely letting the computer program complete 13 steps, a decision rule was needed whereby the "appropriate" step could be selected. In order to avoid over-estimating the strength of the relationship, the step with the lowest F ratio was selected in each analysis. This makes some sense, empirically, since the F ratio required for statistical significance at any chosen level, for example the 5 percent level, increases as independent variables are added to the prediction due to the loss of degrees of freedom. The F ratio will increase, however, as the total accuracy of the prediction is increased. (The selection of the step with the lowest F ratio may be thought of graphically as that point where the increased accuracy of prediction intersects the increasingly higher F ratio required for statistical significance. This also helps to avoid any over-estimation of the statistical significance of the relationship among the variables.)

This procedure resulted in equations which contained from one to eight predictor variables (Table V). Even while selecting the lowest F ratio, six were significant at the 5 percent level, and only one failed to reach the 5 percent level

of significance. Further evidence of the credibility of this procedure was obtained by comparing these multiple correlation coefficients to those obtained by predicting the same criterion measures from the 21 community variables in the larger sample of 100 colleges. Very similar multiple correlations were obtained. The greatest absolute difference was .12, indicating, to some extent, that the relationships which exist between the community variables and output measures for a representative sample of public junior colleges in the United States is quite similar to the relationships among these variables in the sub-sample of California public junior colleges.

In order to assess the extent to which community variables account for variation in financial inputs from college to college, a similar type of regression analysis was computed for each of the three financial variables. The results of these analyses are presented in Table VI. The procedures used in selecting the appropriate equation were the same as those used in the analyses reported in Table V. Since it was not possible to relate this to the larger sample of colleges because of the unavailability of financial data, other evidences of the reasonableness of these results were sought. The results do seem reasonable, though, when compared to similar

analyses with school districts such as those made by H. Thomas James, et al, Jerry Miner, Marvin Alkin and others.[4]

Finally, to assess the extent to which variation in the output measures are related to variation in financial inputs, residual measurements on the output measures were obtained from the first analysis. This was done by subtracting from the actual output measurement for each college the predicted output measurement (in the least squares sense) obtained by regression. Mathematically, this has the effect of removing from the variation of each output measure that amount of variance which can be attributed to differences in community characteristics. These residual measurements were then predicted from the three financial input variables to assess the extent to which the remaining variation can be related to differences in financial input.

The results of this analysis are presented in Table VII. There was no problem in selecting the "appropriate equation" since only three independent variables are present.

Results

Analysis of Tables V and VII, which are graphically summarized in Figure I, indicates that, generally, approxi-

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[4]H. Thomas James, J. Alan Thomas, and Harold Dyck, Wealth, Expenditure and Decision Making in Education, Stanford, California, Stanford University, 1963. Jerry Miner, Social and Economic Factors in Spending for Public Education, Syracuse, New York, Syracuse University Press, 1963. Marvin Alkin, "Religious Factors in the Determination of Educational Expenditures," Educational Administration Quarterly, #2, Spring, 1966, Pages 123-132.

mately half of the variation (variance in the statistical sense) on the criterion measures is attributable to community characteristics. This amount of variation can be thought of as relatively fixed, for it is not easy to change the nature of a community. This could, of course, be achieved by changing district boundaries and incorporating areas differing in social and economic characteristics, but such a method would be no more than an artifice to which no respectable college would resort. In reality, the various components of the community, which contribute to the mean community variable measurements used in this analysis, would probably not experience any great change in treatment due to the inclusion of different populations. If any change is desired in the output measures, that proportion of the variation not explained by community characteristics would be the obvious area at which to look.

The strongest relationship between community variables is found with the percent of students transferring to senior institutions (C3). Approximately 85 percent of the variation is accounted for in this case. Any outside influence, therefore, could result in very little change in this measurement. In the case of probation rates, percent completing B.A. degrees and percent completing A.A. degrees, a relatively smaller amount of variation is accounted for by community variables, thereby, leaving a larger amount of the variance on these output measures to be accounted for by other sources. An outside change agent could reasonably expect to cause greater changes in these areas.

For the remaining variables, approximately half of the variation can be accounted for by community variables leaving half to be accounted for by other means.

The specific contribution of particular community variables is not of direct importance to this study. It is interesting, however, to examine a few of these relationships, though, in general, they are what a person familiar with California public junior colleges might expect. For example, percent of population employed in service occupations is associated with higher percent of technical and vocational students completing programs or receiving employment. Higher associate degree completion rates are found in districts with fewer low income level families. Higher transfer rates are associated with higher incomes, fewer lower level occupations, and more populous districts. The positive association of employment as farmers or farm managers of having a large population, and the negative association of clerical and professional workers with higher transfer rates further describes these districts as being large, though not densely populated, central city districts. Higher probation and dismissal rates are found in more populous districts, with a greater proportion of employment in the operative and professional areas along with a smaller proportion of the population with less than eight years of schooling (reflecting industrialization) and a greater proportion of non-white population. The association of higher B.A. completion rates with greater percentages employed in service occupations

and the presence of a greater proportion of less desirable housing units can be explained by the extremely desirable nature of upward social and economic mobility which characterizes certain segments of the population.

Having accounted for differing amounts of variation with district characteristics, (which must be regarded as relatively unchangeable), it is reasonable to ask what else might explain the remaining variation. The nature and type of financial input is often thought to influence educational outcomes. Before attempting to assess this potential relationship, one must ask to what extent financial inputs are determined by district variables. With any minimum foundation plan of financing, a certain level of input is guaranteed. Variation above (or in a few cases below) this results primarily from district initiative. Consequently, in the consideration of financial inputs, one must realize that a given proportion of the variable is non-functional, in the statistical sense, since it is common to all of the cases.

Table VI indicates that quite a large proportion of the variation from college to college in the three financial input variables is accounted for by district characteristics. Again, the nature of these relationships is quite familiar. Greater inputs are usually associated with less populous districts, higher mean years of schooling of adult population, less work force unemployed, etc.

The analysis of residual measurements (representing that proportion of the original output measurement variance not accounted for by community characteristics) is reported in Table VII. In only one case is the result statistically significant at the 5 percent level. Variables $P6_r$ (percent earning B.A.) and $P7_r$ (sum of percent probation and dismissal) appear to be largely unaffected by differences in financial inputs. Variables F1 and F2 (instructional and total expenditures) do not contribute at all to the prediction of variable $P6_r$. To some extent, the lack of relationship for variable $P7_r$ (sum of $P4_r$ - percent probation and $P5_r$ - percent dismissed) is explained by the differing relationships for $P4_r$ and $P5_r$ separately. Instructional costs are associated positively with probation rates (more instructional expenditure associated with more students being placed on probation), but negatively with dismissal rates (more instructional expenditure associated with fewer students being dismissed). Similarly, non-instructional expenditures are related to variables $P4_r$ and $P5_r$. (More expenditure is associated with more probationary students but fewer dismissals.) Total expenditures are related inversely to variables $P4_r$ and $P5_r$. (More gross expenditures are associated with fewer students being placed on probation but more students being dismissed.) It is, perhaps, important to observe that instructional expenditures are more strongly associated with variables $P4_r$ and $P5_r$ than are total expenditures and non-instructional expenditures.

Interestingly, instructional and non-instructional expenditures are associated with lower transfer rates ($P3_r$), whereas total gross expense is associated with higher transfer percentages. This relationship, while accounting for a relatively large proportion of the residual variance, is of less importance when it is remembered that 80 percent of the original variance had already been accounted for by district variables.

Variables $P1_r$ and $P2_r$ are only modestly related to financial inputs.

Summary

For a sample of 15 California public junior colleges, 21 community variables which account for the major differences from district to district were selected. Seven criterion variables, indicative of output dimensions, were obtained from data supplied by the colleges. These output variables gave indication of what happens to students, in a statistical sense, who are enrolled in the various colleges. Three indicators of financial input to the colleges are included. These represent dollar inputs per ADA for instructional aspects of the educational programs, for non-instructional aspects of the programs, and for gross financial inputs for all purposes. Stepwise multiple regression analyses were conducted to (1) estimate the extent to which community characteristics determined

differences on the output measures for the colleges; (2) the extent to which community variables account for differences on the financial variables across the sample of colleges; and (3) the extent to which variation on the output variables not explained by differences in communities can be explained by differences in financial inputs.

Analysis of the data supports the following general observations:

1. Given the extent to which the sample of colleges differ on the output variables, approximately half of this variation can be explained by the extent to which the communities of college districts differ. Community characteristics seem to be most effective in the determination of the percent of students transferring to senior institutions (85 percent of the variance) and less effective in the determination of the percent of students completing A.A. degrees, being placed on probation, and completing B.A. degrees--approximately one-third of the variance.
2. The extent to which financial inputs differ among the colleges in the sample can be largely explained by differences in community characteristics--approximately nine-tenths of the variance.
3. After taking into consideration the extent to which criterion variables are related to community charac-

teristics (by otaining residual measurements) approximately three-tenths of the remaining criterion variance can be attributed to variations in types and amounts of financial inputs among the sample colleges. Financial variables appear to be substantially related to the percent of students placed on probation (39 percent), moderately related to percent completing A.A. degrees (18 percent) and only slightly related to the other variables. In general, instructional expenditures seem to be more strongly related than other classifications of expenditures.

4. If the extent to which the criterion variables are not determined by community variables is to be determined through variation of financial inputs, this must come from outside the districts (i.e., state governments), since nearly all of the current variation in financial input and about half of the output variance is attributable to characteristics of the districts.

Table I

CALIFORNIA PUBLIC JUNIOR COLLEGES INCLUDED IN STUDY

College	
Allan Hancock College	1960: Santa Barbara SMSA Census Tracts: GU 25, LO 27, 28, MR 26, OR 20, PF 18, SM 21-24, SY 19. 1950: Approximation of above using Santa Barbara County minus cities of Santa Barbara and Carpenteria.
Barstow College	1960: San Bernardino-Riverside-Ontario SMSA Census Tracts: 89, 90 93, 94, 95, 96, 103. 1950: Approximation of above using Barstow (city).
Cabrillo College	Santa Cruz County.
College of the Desert	1960: San Bernardino-Riverside-Ontario SMSA Census Tracts: 145-157, 158 (2/3). 1950: Approximation of above using cities of Indio, Coachella, Palm Springs.
Coalinga College	1960: Fresno SMSA Census Tracts: 77-84. Coalinga, Lemoore and Avenal added after approximation. 1950: Approximation of above using cities of Coalinga, Mendota*, Dos Palos*. Add after approximation[1] Lemoore and Avenal.
College of the Sequoias	1960 & 1950: Armona, Corcoran, Cutler, Exeter, Farmersville, Goshen, Hanford, Ivanhoe, Orosi, Pixley, Tulare, Visalia, Woodlake, Woodville.
Compton College	1960: Los Angeles-Long Beach SMSA[2] Census Tracts: 5362, 5543, 5400-5403, 5405-5408, 5411-5432, 5535-5539, 5433. 1950: 524, 526A, 526B, 526C, 527A, 527B, 527C, 527D, 529B, 529C, 530A, 530B, 531B, 532, 534A, 534B, 535A, 535B, 535C, 535D, 535E, 535F, 536A, 536B, 335B.
Diablo Valley College	1960: San Francisco-Oakland SMSA Census Tracts: 1-46, 55. 1950: Approximation of above using cities

	of Antioch, Brentwood*, Byron, Concord, Danville*, Diablo*, Knightsen*, Martinez, Oakley*, Pacheco*, Pittsburg, Port Chicago*, San Ramon*, Walnut Creek*.
Foothill College	1960: San Jose SMSA Census Tracts: F46-47, H61, G48, N92-105, P117, M84, M86-91, L77-83, 0 106-116. 1950: Approximation of above using cities of Palo Alto, Mountain View, Sunnyvale.
Los Angeles City College	1960: Los Angeles Census Tracts 1872, 1873, 1882, 1891-1899, 1901-1909, 1911-1919, 1921, 1927, 1941-1945, 1951-1959, 1971-1977, 2062-2064, 2071-2079, 2081-2089, 2091-2098, 2111-2119, 2121-2129, 2131-2134, 2141-2149, 2151-2153, 2161-2169, 2171, 2172, 2181-2189, 2191-2199, 2201, 2202, 2211-2219, 2221-2227, 2241-2247, 2261-2267, 2281-2289 2291-2294, 2311-2319, 2321-2328, 2341-2349, 2351-2352, 2361-2364, 2371-2379, 2381-2386, 2391-2399, 2401-2407, 2691, 2692, 2694-2698, 2701-2703, 7001-7005, 7024. 1950: Los Angeles Census Tracts 30, 31A, 32A, 32B, 51, 52A, 52B, 53, 54, 55A, 55B, 56, 57, 58A, 58B, 59, 61-67, 77, 78, 79A, 79B, 80A, 80B, 81-98, 99A, 99B, 100, 101B, 103-109, 110A, 110B, 111-114, 115A, 115B, 116, 117, 145A, 145B, 146A, 146B, 148-150, 151A, 151B, 152-154, 155A, 155B, 156-164, 165A, 165B, 166-169, 170A, 170B, 171-184, 185A, 185B, 186-189, 197A, 197B, 198-200, 201A, 201B, 202-206, 207A, 207B, 208-229, 231-275, 276A, 276B, 277, 279, 280A, 280B, 281, 342B, 364A, 364B, 365B, 366, 367, 368B, 384A, 384B, 385, 386, 387A, 387B.
Los Angeles Valley College	1960: Los Angeles-Long Beach SMSA Census Tracts 1011-1014, 1021, 1031-1034, 1041-1048, 1061-1068, 1091, 1094-1096, 1171-1176, 1191-1199, 1201-1204, 1211-1219, 1221-1224, 1231-1239, 1241-1249, 1251-1256, 1271-1279,1281-1289, 1321, 1411-1417, 1431-1439, 3201, 3203. 1950: 1, 4A, 4B, 5-9, 10A, 10B, 10C, 11A, 12, 17A, 17B, 17C, 18A, 18B, 19A, 19B, 20, 201S, 21B, 21C, 22, 23A, 23B, 24, 25A, 25B, 25C, 29A, 29B, 556A, 556B, 555.

Modesto Jr. College	1950 & 1960: Stanislaus and Tuolumne Counties. Cities of Gustine, Los Banos and Ripon.
San Bernardino Valley College	1960: San Bernardino-Riverside-Ontario SMSA Census Tracts: 27, 33, 35-71, 74, 76, 77, 101. 1950: Approximation of above using cities of Bloomington, Colton, Crestman, Del Rosa, Highland, Rialto.
Sierra College	Nevada and Placer Counties.
Ventura College	Ventura County.

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[1] No data available for 1950. Statistics were assumed to have remained relatively stable over the ten year period. Therefore, 1950 data was generated by projecting backwards from 1960, using the same line as for other units.

[2] Census Tracts 5433 for 1960 and 335B for 1950 do not have the same northern boundaries.

*All starred areas were originally included for data collection but subsequently not used because of unavailability of date, due to the small size of the areas.

Table II

COMMUNITY VARIABLES DESCRIPTIVE OF FIFTEEN CALIFORNIA PUBLIC JUNIOR COLLEGES

Code Symbol	Variable	Mean	Standard Deviation
C1	Percent families with income less than $3000 per year.	10.7	4.8
C2	Percent families with income from $4000-4999 per year.	7.5	3.3
C3	Percent families with income greater than $6000 per year.	64.0	9.2
C4	Percent adults with 8 years of schooling.	17.2	6.3
C5	Percent adults with 4 years of high school.	27.0	3.9
C6	Percent adults with 4 years of college.	8.7	4.2
C7	Ratio of rental to owner occupied housing units.	75.5	51.8
C8	Percent males widowed and divorced.	4.2	1.3
C9	Percent work force unemployed.	10.6	4.1
C10	Percent population married.	47.2	2.5
C11	Percent population non-white.	8.5	11.9
C12	Percent housing units vacant plus percent with more than one occupant per room.	15.2	5.1
C13	Percent population aged 20-34 years.	17.9	3.4
C14	Percent population aged over 35 years.	52.0	11.7
C15	Percent employed in service occupations.	8.6	1.8
C16	Percent employed as operatives.	14.3	4.9
C17	Percent employed as professionals.	13.2	5.3

Code Symbol	Variable	Mean	Standard Deviation
C18	Percent employed in private occupations.	2.3	.7
C19	Percent employed in clerical occupations.	16.5	9.3
C20	Percent employed as farmers or farm managers.	10.0	4.3
C21	Population of district (with Log_e transformation)*.	11.9	.9

*This transformation was selected to compensate for the highly positively skewed distribution of this variable.

Table III

FINANCE VARIABLES FOR FIFTEEN CALIFORNIA

PUBLIC JUNIOR COLLEGES

Code Symbol	Variable	Mean	Standard Deviation
F1	Total instructional costs per ADA.	486.7	72.7
F2	Total current expense for education per ADA.	669.2	150.0
F3	Total current expense for education minus total instructional costs and transportation costs per ADA.	170.0	82.8

Table IV

OUTPUT VARIABLES FOR FIFTEEN CALIFORNIA PUBLIC JUNIOR COLLEGES

Code Symbol	Variable	Mean	Standard Deviation
P1	Percent technical and vocational enrollments* completing program and/or obtaining relevant employment	15.1	13.9
P2	Percent enrollment completing A.A. degree	5.4	2.0
P3	Percent enrollment transferring to a senior institution	5.3	3.2
P4	Percent enrollment placed on probation during academic year	13.5	5.1
P5	Percent enrollment dismissed from college during academic year	6.3	3.6
P6	Percent enrollment completing B.A. degree after transfer	3.4	1.9
P7	P4 + P5	19.8	7.1

*Enrollment figures for denominators refer to Fall, 1964. Numerator figures refer to entire 1964-1965 academic year except for C6 which was estimated by multiplying the proportion of transfers that complete a degree (provided by colleges) by the proportion of the enrollment transferring.

Table V

PREDICTION OF OUTPUTS FROM COMMUNITY VARIABLES

FOR FIFTEEN CALIFORNIA PUBLIC JUNIOR COLLEGES

Predictor Variables	Dependent Variable						
	P1	P2	P3	P4	P5	P6	P7
C1		-.04					
C2			-.50				
C3			.14				
C4			-.29	-.44			
C7		.03					
C8	-9.13				1.79		
C10		.52					
C11					.20		
C12						-.24	
C13	2.72	-.25					
C14	.73		.07				
C15	6.86					.38	
C16							.77
C17			-.25		.23		.46
C18					-3.26		
C19			-.40				
C20			.79				
C21			3.21				2.73

Predictor Variables	Dependent Variable						
	P1	P2	P3	P4	P5	P6	P7
Constant	-91.78	-16.27	-34.38	21.06	1.79	3.80	-29.77
Multiple R	.77	.57	.92	.55	.77	.63	.75
Multiple R^2	.59	.32	.85	.31	.60	.39	.56
Significance	5%	NS	5%	5%	5%	5%	5%

Table VI

PREDICTION OF FINANCE VARIABLES FROM COMMUNITY VARIABLES FOR FIFTEEN CALIFORNIA PUBLIC JUNIOR COLLEGES

Predictor Variable	Variable	Regression Coefficients for Dependent Variables		
		F1	F2	F3
C4	Percent adults with 8 years of schooling.	8.50	18.28	
C6	Percent adults with 4 years of college.	4.82		
C9	Percent work force unemployed.	-8.38	-22.90	
C10	Percent population married.			-15.18
C12	Percent housing units vacant plus percent with more than one occupant per room.			.73
C15	Percent employed in service occupations.	13.80	52.71	
C16	Percent employed as operatives.		-8.82	
C19	Percent employed in clerical occupations.		4.57	
C21	Population of district (with Log_e transformation).			-68.98
Constant		268.07	193.38	1696.92
Multiple R		.83	.92	.82
Multiple R^2		.69	.85	.68
Significance Level		2.5%	1%	1%

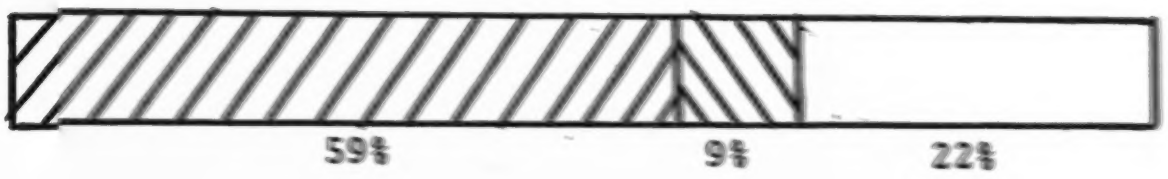
Table VII

PREDICTION OF OUTPUT VARIABLE RESIDUALS FROM COMMUNITY VARIABLES FOR FIFTEEN CALIFORNIA PUBLIC JUNIOR COLLEGES

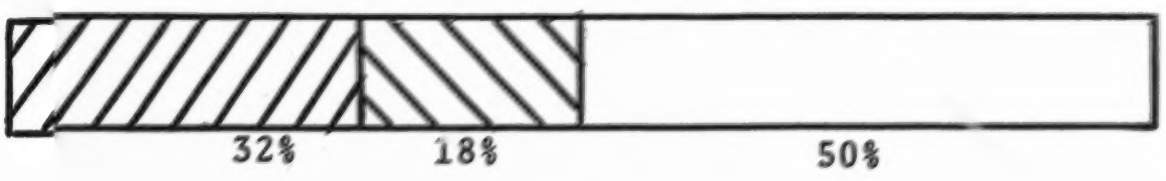
Predictor Variable	Regression Coefficients for Dependent Variable Residuals						
	$P1_r$	$P2_r$	$P3_r$	$P4_r$	$P5_r$	$P6_r$	$p7_r$
F1	-.22	-.06	-.17	.16	-.08		.03
F2	.12	.05	.14	-.09	.06		-.03
F3	-.06	-.05	-.10	.03	-.05	-.01	.02
Constant	35.68	2.96	10.84	-21.51	7.09	.94	1.81
Multiple R	.46	.52	.62	.75	.46	.30	.26
Multiple R^2	.21	.27	.38	.56	.21	.09	.07
Significance Level	NS	NS	NS	5%	NS	NS	NS

Figure 1

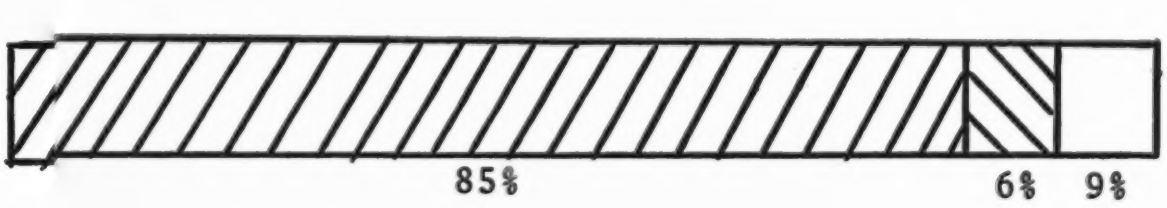
P1 Percent technical and vocational enrollments completing program and/or obtaining relevant employment



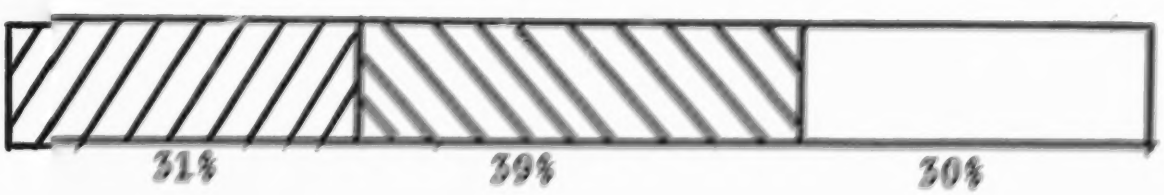
P2 Percent enrollment completing A.A. degree

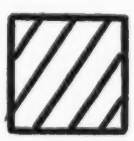


P3 Percent enrollment transferring to a senior institution

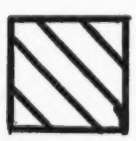


P4 Percent enrollment placed on probation during academic year





Variation (variance) related to characteristics of the district



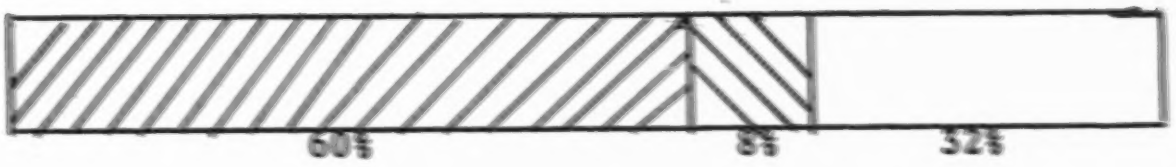
Remaining Variation (variance of residuals) attributable to financial variables after removal of district effects

Remaining unexplained variation

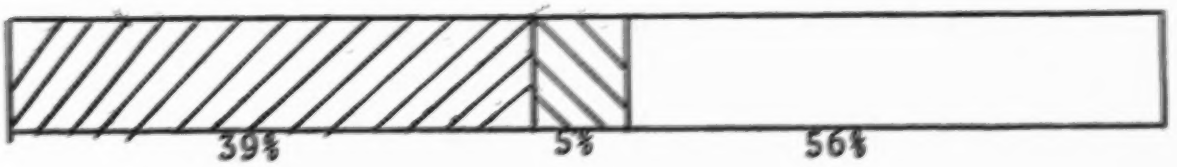
Percentages refer to total variance

Figure 1

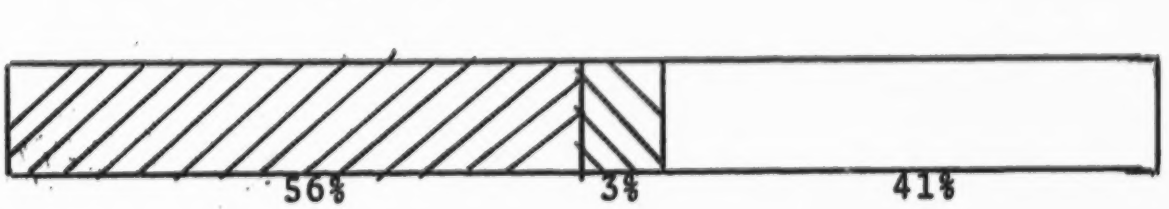
P5 Percent enrollment dismissed from college during academic year

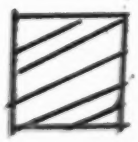


P6 Percent enrollment completing B.A. degree after transfer



P7 P4 + P5





Variation (variance) related to characteristics of the district

Remaining Variation (variance of residuals) attributable to financial variables after removal of district effects.

Remaining unexplained variation

Percentages refer to total variance.